AECOM

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Memorandum

Date: March 20, 2009

To: Sandra Brunelli (CTDEP)

From: David F. Mitchell, Ph.D.(AECOM)/ Christine Archer (AECOM)

Subject: Inspection of two detention basins and former drainage swale at Arch Chemical facility, Cheshire, CT

Distribution: Stephanie Carr (USEPA); Gayle Taylor (Arch)

This memorandum provides information on the drainage patterns and other characteristics of two detention basins located at the Arch Chemicals, Inc. (Arch) facility located at 350 Knotter Drive in Cheshire, Connecticut. This information is presented as part of an ecological risk assessment which is being conducted as part of the Resource Conservation and Recovery Act (RCRA) Closure activities underway at the Arch facility.

The basis for this memo is a site inspection conducted on February 24, 2009. The primary objectives of this inspection were to provide additional information about these basins and to identify soil sampling locations to evaluate potential surface soil impacts due to historic overland flow towards the basins. A secondary objective was to attempt to locate a drainage swale that historically discharged chiller condensate and non-contact cooling water to the Ten Mile River. This drainage swale was located and is also described within this memo.

The evaluation of the two basins is part of the activities described in the Ecological Risk Workplan (ENSR, 2007), as supplemented by the Ecological Risk Workplan Addendum (ENSR, 2008). In response to comments by USEPA regarding the Workplan, AECOM and Arch agreed to provide additional information regarding the watershed and potential sources of water in these two basins prior to the submittal of the Ecological Risk Assessment report.

The Arch property is located along Knotter Drive, the primary access road for a large and active industrial park used for light industrial manufacturing or commercial activities. The Arch property is bounded to the north by the Atlantic Inertial Systems (AIS), to the northwest by the Pratt and Whitney Cheshire Engine Center, and to the south by the Macy's/Bloomingdale's catalog/storage facility (see Figure 1). These multi-acre sized structures and extensive parking lots provide extensive impervious cover in the watershed. Furthermore, several of these facilities have large truck loading docks. In addition to these facilities, a large building was built at the corner of Knotter Drive and the long access road lead to the Macy's building. Other upstream land uses includes agricultural fields, wetland areas, and Interstate I-84.

The general layout of the industrial park and flat elevation indicates that many of the facilities are located on historically-filled wetlands, with poor drainage, and residual wetland areas existing in the

periphery of the developed areas. The general pattern of natural drainage is west to east, with several water channels arising in hills to the west and eventually flowing to the Ten Mile River (see Figure 2). The two detention basins are located in different sub-watershed drainages and are described in detail below.

Northern Detention Basin

The northern detention basin is an approximate 1.5-acre man-made waterbody, apparently excavated as part of the Knotter Drive industrial park development (based on symbols on USGS topographic map). Photographs 1 through 5 document current conditions at the northern detention basin.

The northern detention basin receives water from a headwater stream that originates just west of I-84. The stream flows northeast along the highway corridor before crossing under I-84 and going west toward the pond. There is a large detention basin on the Pratt & Whitney property which also drains towards the northern detention basin. Inspection of the local drainage and inlet structure (approximate 9-foot concrete inlet) at Knotter Drive indicates that local road runoff is routed to the northern detention basin, as well as lawn drainage from the Arch facility. As noted in the previous site inspection (summarized in the Work Plan (ENSR, 2007)), there are 25 to 30 resident Canada geese at the pond.

There is an unregulated outlet (i.e., no control structure) on the pond and downstream flow goes into a man-made channel that flows east through a wooded area between AIS and the Arch facility. This channel was actively flowing during the time of inspection.

Stormwater runoff from the Arch facility parking lots and roof runoff is routed to the stream via a central storm drain system which outlets directly to the stream. Stormwater from AIS drains off the drive and parking lot in three locations so that there is overland flow to the stream. Downstream of the Arch facility, the stream widens and eventually flows through wetlands into the Ten Mile River.

In summary, the northern detention basin is a recent man-made structure, whose water quality may be influenced by upstream sources (I-84, Pratt & Whitney), localized stormwater inputs from neighboring roads and parking lots, and by the presence of the resident geese flock. These influences should be considered when evaluating the risk potential posed by the historic sub-surface soil releases.

Southern Detention Basin

The southern detention basin is an approximate 2 to 3 acre man-made basin originally created by a 5-foot high earthen berm that impounds streamflow. Photographs 6 through 14 document current conditions at the southern detention basin. The basin appears to pre-date the construction of the Knotter Drive industrial park (based on appearance on older USGS topographic maps) and may have originally been used for agricultural purposes. The outflow from the pond flows approximately 150 feet east before it confluences with the Ten Mile River.

The watershed of the southern detention basin drains wetland areas to the west and southwest of the Arch facility (crossed by natural gas pipeline corridor). In addition, drainage crosses the access road to the Macy's facility near the newly constructed building on Knotter Drive. Stormwater on the access road is routed to wetlands on either side. There is also a flooded channel parallel to the pavement on the north side of the Macy's facility near the truck loading area. Based on this inspection, it appears that stormwater is indirectly routed to the southern detention basin. Since the stormwater flows into the wetlands and/or recharges the groundwater before discharge to the southern detention basin, it is likely that water quality in that basin is less impacted by stormwater, compared to the northern detention basin.

The condition of the southern detention basin indicates that it is not actively maintained and has not been for some time. The eastern berm is fully vegetated and currently pierced by a large (8 ft wide) opening that appears to be quite old. Based on the shallow appearance of the pond, the invasion of emergent vegetation at the western (upstream) end, and the appearance of the banks along the northern edge, the basin holds much less water than when originally constructed. The appearance of the shoreline suggested that the water elevation fluctuates and the basin may be periodically or seasonally flooded. This would be consistent with seasonal periods of high groundwater and/or the influence of stormwater discharges from facilities located on Knotter Drive.

Inspection of the northern shoreline did not indicate a sediment delta associated directly with the boiler blowdown discharge channel described below. There is a small but deeply eroded channel, near the boundary between open water and the emergent wetland vegetation. This channel is no more than 30 feet long and appears only to drain runoff from a relatively flat wooded area. Since this is the only area where a drainage channel enters the southern detention basin, a soil sample location is proposed at the downstream end of this drainage, near the base of the earthen berm (candidate soil sampling locations were marked by a wooden stake and flagged with colored tape for sampling to be conducted in the spring; see Figure 3).

Discharge Drainage Swale

Based on the historic discharge permit, the wooded area behind the Arch facility was inspected for the drainage swale. Using the approximate angle indicated by the 1983 diagram, the drainage swale was easily located. The swale is located off the southeast corner of the building's southern extension, currently behind a pile of wooden pallets. Photographs 15 through 20 document current conditions at the drainage swale.

The drainage swale starts at a 5-foot concrete headwall which contains a half-buried pipe. The channel is approximately 120 feet long and one to two feet deep. The southern bank is higher and appears to be the result of sidecast material during the swale creation. The banks of the swale are heavily vegetated with shrubs and trees. Four soil samples locations are proposed in the upstream and downstream ends of the swale and two samples were are proposed in the bank area.

Water was present in the drainage swale, but was iced over and not flowing. At the end of the swale there was accumulation of woody plant material and other debris. Beyond the end of the swale, there was no clear indication that flow went through the wooded area. The topography and vegetation did not indicate that an organized flow was presently occurring. There was no indication that the discharge ever flowed into the southern detention basin.

The present condition of the swale and vegetation located downstream of its southeastern end indicates that it has not discharged flow to the wooded area to the southwest of the facility for quite some time. The water present in the swale during the February inspection is likely due to local drainage or high groundwater in the area. It has not been definitively shown that the pipe at the headwall does not still convey flow, but it does not appear to be active. The four proposed soil samples in or adjacent to the swale (see Figure 3) will be evaluated in the ecological risk assessment.

References

ENSR. 2007. Ecological Risk Assessment Work Plan. Arch Chemicals, Inc., 350 Knotter Drive, Cheshire, Connecticut. April 2007.

ENSR. 2008. Ecological Risk Assessment Work Plan Addendum. Arch Chemicals, Inc., 350 Knotter Drive, Cheshire, Connecticut. July 2008.

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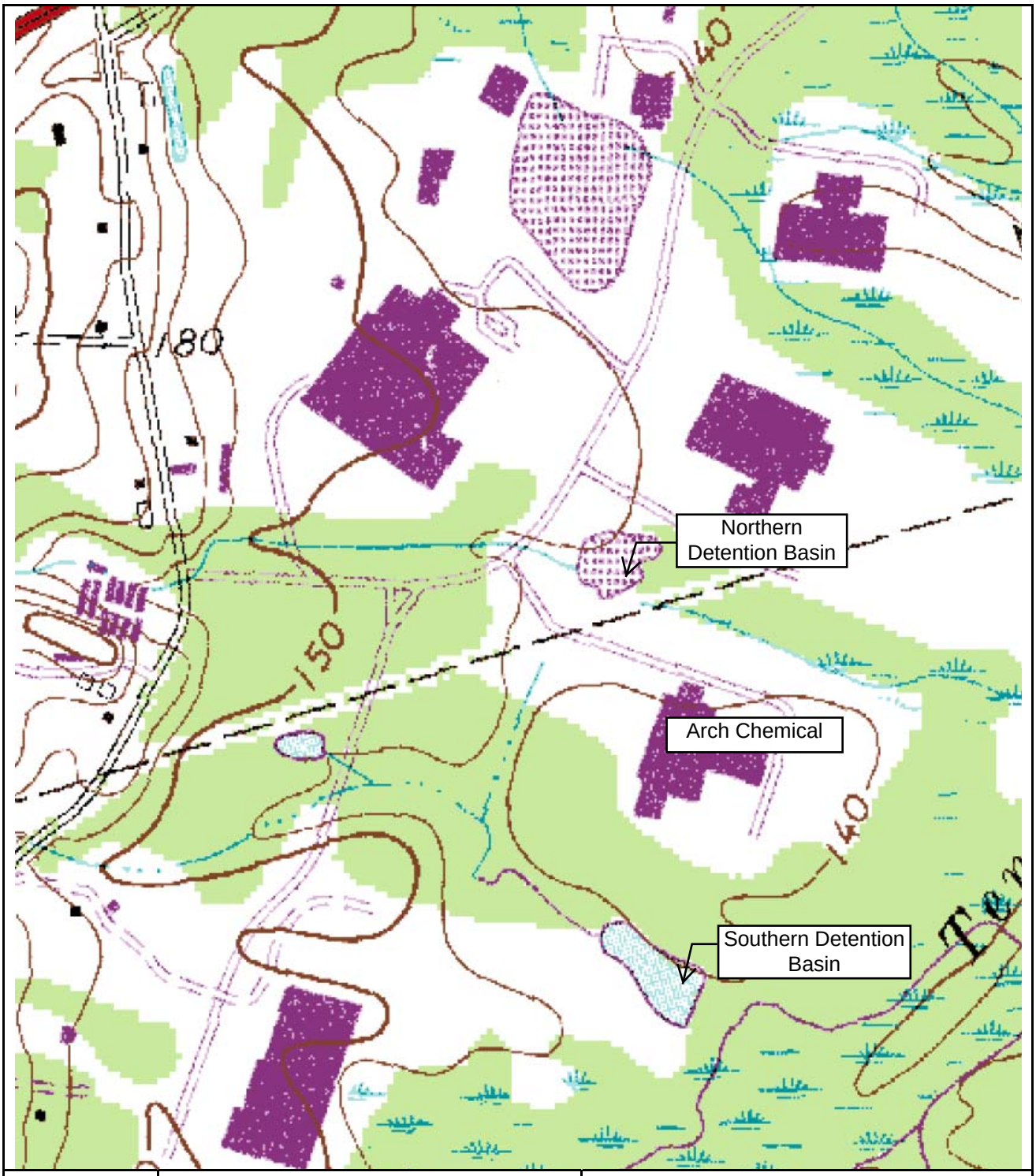
FIGURES

AECOM	**Arch Chemical Cheshire, CT**	**Local Land Use Map** **Figure 1**

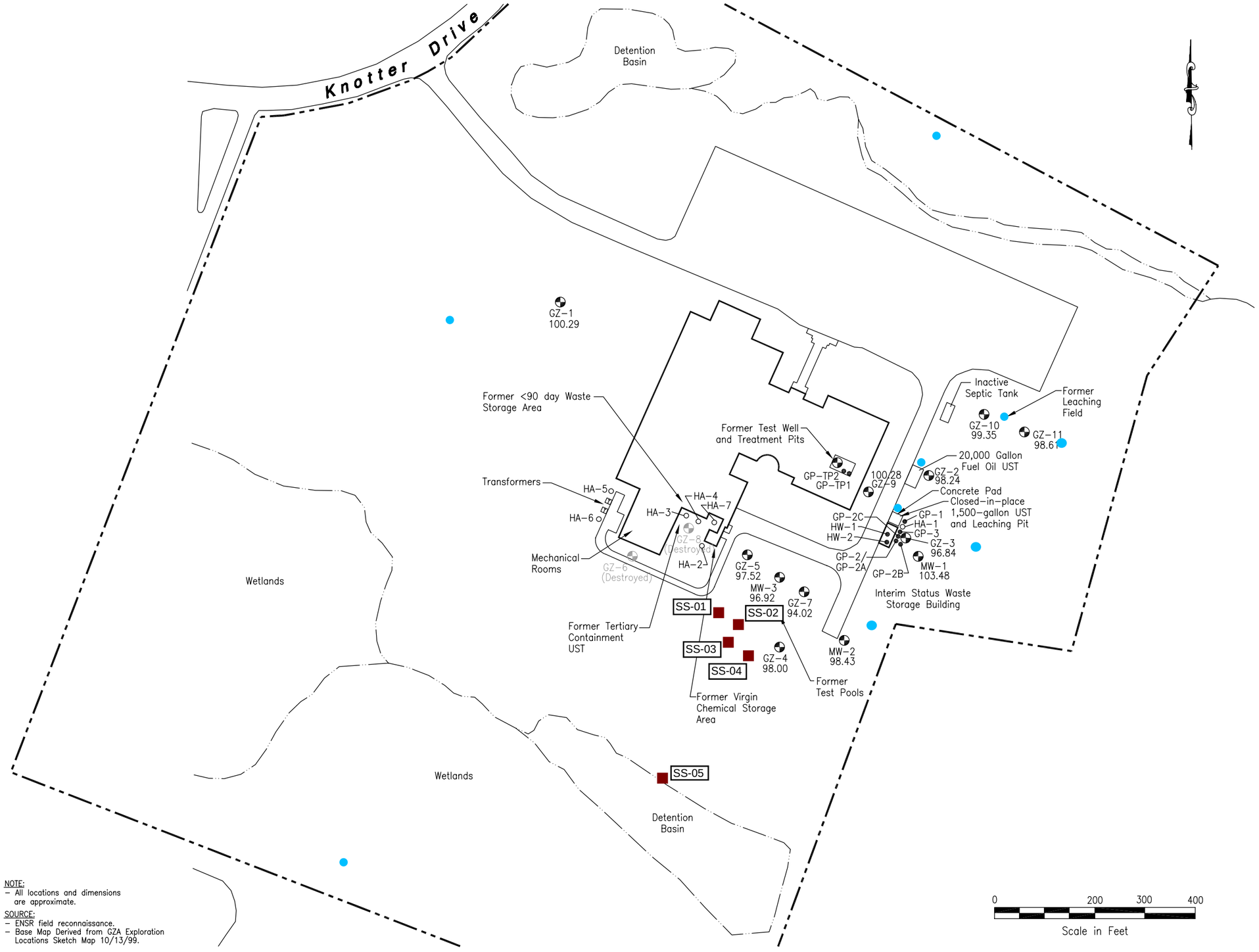


AECOM

Arch Chemical
Cheshire, CT

Drainage and Topographic Map

Figure 2



NOTE:
- All locations and dimensions are approximate.

SOURCE:
- ENSR field reconnaissance.
- Base Map Derived from GZA Exploration Locations Sketch Map 10/13/99.

LEGEND:

———	Approximate Property Boundary
GZ-9 100.28	Monitoring Well/Soil Boring with Well Head Elevation (installed by GZA, 1999)
GP-1 HW-1	Geoprobe Location
MW-1	Monitoring Well/Soil Boring with Well Head Elevation (installed by ENSR, 2001)
HA-1	Shallow Hand Auger Sample

- Proposed Sampling Location
- Proposed Sampling Location Staked Out During February 24, 2009 Site Visit

Sampling locations are approximate. Final locations will be selected based on observed field conditions.

CLIENT

Arch Chemicals, Inc.
1200 River Road
Charleston, Tennessee 37310

PROJECT TITLE

Arch Chemicals, Inc.
350 Knotter Drive
Cheshire, Connecticut

FIGURE TITLE

Site Plan

APPROVED BY	REVIEWED BY
DRAWN BY: G. Moquin	SCALE: 1" = 200'
JOB NUMBER: 0489-004	DATE: February 2004

ENSR
2 Technology Park
Westford, Massachusetts
(978) 589-3000

Figure 3

SHEET

C:\048905B.DWG

PHOTOGRAPHS

Photo #1. Inlet of N. basin at Knotter Drive

Photo #2. Inlet of N. basin, showing runoff from lawn area.

Photo #3. Inlet of N. basin, looking east towards iced basin.

Photo #4. Stormwater outlet draining to outlet stream of N. basin, This drains the parking lot and portions of facility.

Northern Detention Basin at Arch Facility, Cheshire, CT (02/24/09)

Photo.#5. Outlet from N. Basin near TenMile River.

Photo #6. Outlet of S. Basin, looking west towards opening in earthen berm.

Photo #7. Outlet of S. Basin flowing intoTenMile River.

Outlet streams of Northern and Southern Detention Basins at Arch Facility (2/24/09)

Photo #8. View west of S. detention basin at Arch property,

Photo #9. View of northern bank off S. detention basin.

Photo #10. S. basin, view northwest towards northern shoreline (1).

Photo #11. S. basin, view northwest towards northern shoreline (2).

Southern Detention Basin at Arch Facility, Cheshire, CT (02/24/09)

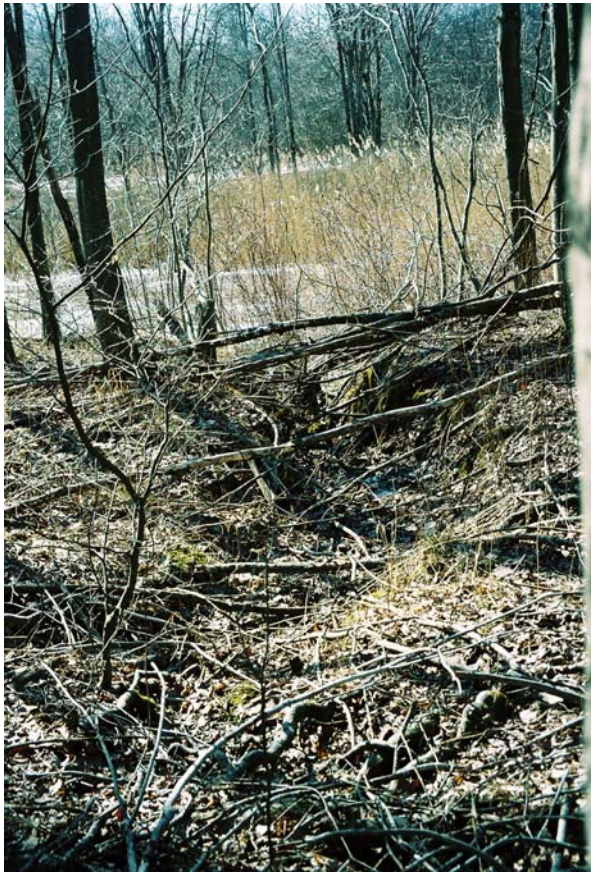


Photo #12. Channel at northern bank of S. basin.

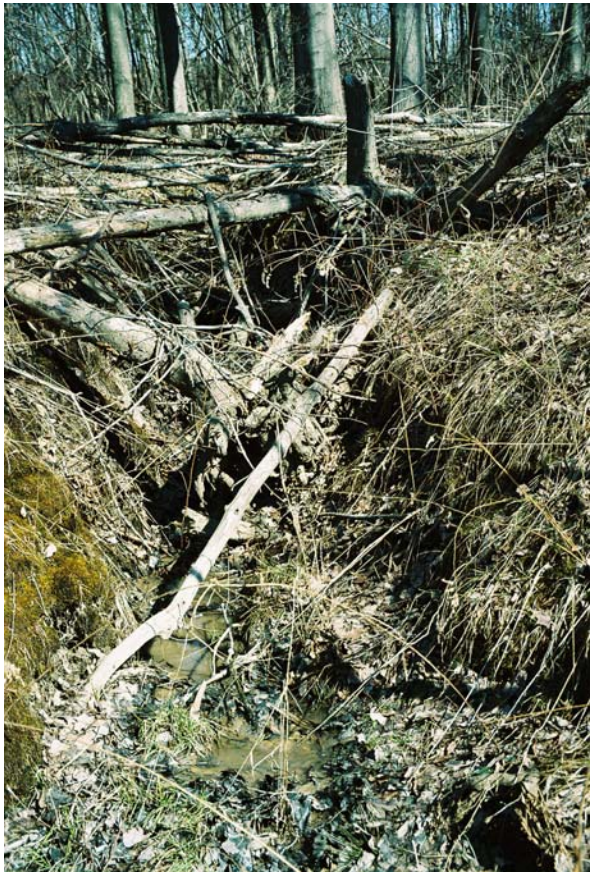


Photo #13. Channel at northern bank of S. basin

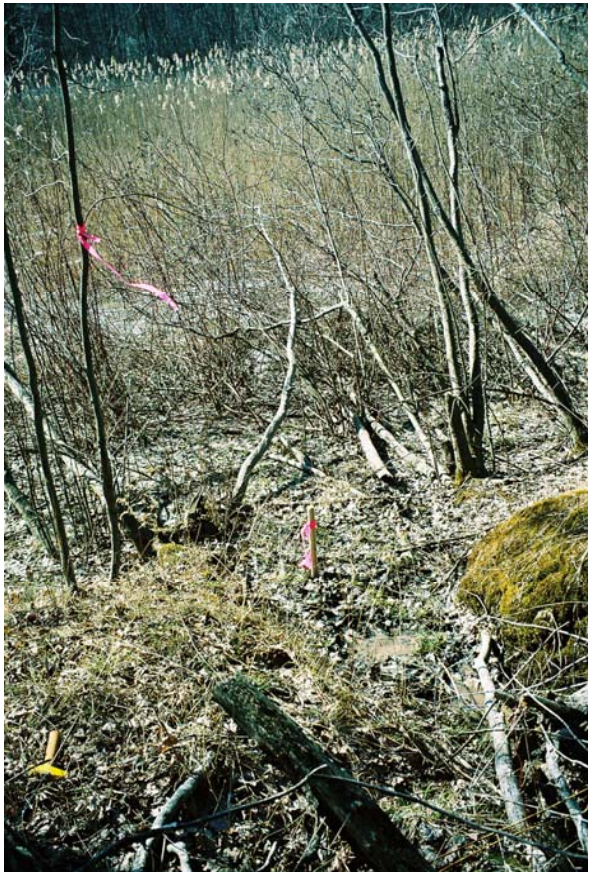


Photo #14. Site of soil sampling location “SS-05”.

Location of Soil Sample at bank of Southern Detention Basin (2/24/09)

Photo #15. View of discharge swale, w/ Arch in bkgd.

Photo #16. View southwest from end of swale.

Photo #17. Location of soil sample location “SS-04”.

Discharge Swale at Arch Facility (2/24/09)

Photo #18. Concrete headwall at head of swale (pipe not visible).

Photo #19. Location of in-channel soil sample “SS-01”

Photo #20. Location of sidebank soil samples “SS-02 and SS-03.”

Discharge Swale at Arch Facility (2/24/09)